

Virginia Wildlife

OCTOBER 1974

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Virginia Wildlife

**Dedicated to the Conservation of
Virginia's Wildlife and Related Natural Resources
and to the Betterment of
Outdoor Recreation in Virginia**

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OCTOBER

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Observations, conclusions and opinions expressed in *Virginia Wildlife* are those of the authors and do not necessarily reflect those of the members or staff of the Commission of Game and Inland Fisheries.

COVER: White-tailed deer in fall setting, an acrylic by Commission artist-photographer Carl C. Knuth.

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The Steel Trap . . .

THAT is what the current U. S. Fish and Wildlife Service proposal to ban lead shot for waterfowl hunting has been called by some. Others, including prominent conservation organizations like the National Wildlife Federation, have pushed the proposal with evangelistic zeal. Experiments and investigations have nailed down certain facts and loose ends, but even in sum total they don't provide a clear-cut answer to the big question, "Will the change save enough ducks to justify it? In fact, will it save any ducks?"

Certain facts have been reasonably well established:

1. Iron shot can be manufactured at affordable prices and of a quality so as not to cause unreasonable wear, at least in some guns.

2. Iron shot will effectively kill ducks up to 40 yards although there is evidence it might be somewhat less efficient than lead. Beyond this, efficiency seems to fall off rapidly.

3. Ducks have considerable concentration of lead in their bones, especially those in the Atlantic flyway. There is no satisfactory evidence that the majority of this comes from ingestion of lead shot, especially since Atlantic flyway ducks have three times as much lead as those from other flyways, yet they were found to have fewer ingested shot. The lead may come from car exhaust washed into our waters.

4. Ingested lead shot will kill ducks, the lethal dosage varying from less than three pellets for birds on a grain diet to more than eight pellets for those on a diet including green vegetation.

These facts, plus a lot of conjecture, expansion, and extrapolation, form the basis for both sides of the argument. The opponents hold out the hope of degradable or non-toxic alloys as an alternative.

One thing is certain: this will be a one-way decision. If clear-cut evidence cannot be assembled to support a ban on lead shot, there is little hope that conclusive evidence could be gathered to support removal of the ban if it didn't produce the desired results. There is also some question as to its enforceability since once the evidence passes out the end of a gun barrel, it is impossible to collect (except by the ducks, apparently). Some have suggested selective bans on lead duck loads (high base shells in shot sizes 3-5) or punitive taxes on lead loads in these sizes to make them economically unattractive. Such restrictions would be much easier to enforce than shaking down duck hunters to determine if they were using lead shot.

If you stand in favor of banning lead shot, the decision will be much like jumping out of an airplane—there is no going back. If you are not ready to jump, you have until November 15 to let the U. S. Fish and Wildlife Service know. Otherwise, you will be restricted to steel shot during the 1976 waterfowl season and probably forever after.

To help you make up your mind, copies of the proposed regulation and a draft of the environmental impact statement supporting it are available from the U. S. Fish and Wildlife Service, Office of Environmental Coordination, Washington, D. C. 20240. Comments should be forwarded to the same address.—H.L.G.

Thank You, Reynolds Metals

EXAMINATION of advance copies of the September issue of *Virginia Wildlife*, just off the press, made obvious to the Game Commission's Education Division a glaring oversight. We had neglected to carry a credit line for the page 22 colorful cookery photo. We are very much indebted to Reynolds Metals Company of Richmond for their generous loan of that gorgeous transparency for one-time reproduction.—Ed.

Something Fishy

IN mid-August while fishing in the Shenandoah River near Berryville I had two 13-½ inch smallmouths jump into my boat. I believe this is most unusual. It makes quite a fish story, but a true one.

Earl Cloewser
Winchester

Earlier last summer a gentleman came into our office with a 12-inch largemouth that jumped into his boat while he was fishing in the James River. Perhaps the fish have decided to surrender quietly without a fight.
—Ed.

Gilbert Art Popular With State Magazines

I thought I detected a bit of plagiarism in the use of the eastern bluebirds painting by Albert E. Gilbert on the August cover of *Virginia Wildlife*, and sure enough, I went digging through some old issues of the *New York State Conservationist* and found they had used this same painting on the April-May cover. Believe me, there are a lot worse things you could do than copy the *Conservationist*; we are still subscribing after five years absence from New York, with no intention of stopping. But *Virginia Wildlife* is also excellent, in my opinion. I particularly appreciate your editorials. They may anger some people—but then, what are friends for?

R. G. Wood
Richmond

A number of states have used the bluebird painting and others in this series through the courtesy of the National Wildlife Art Exchange, P.O. Drawer 3385, Vero Beach, Florida. We agree that the New York Conservationist is an excellent publication.—Ed.

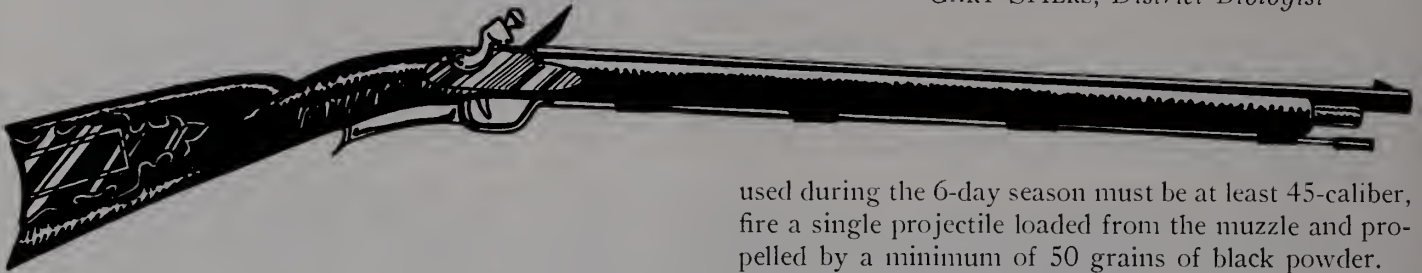
Pictures Come to Life

I especially like wild flowers and birds. The back of April issue on Virginia woodpeckers was so pretty. I see the pileated one often, and feed the red-bellied one nuts each day. If none are out, he sits on a limb and calls.

Mrs. S. G. Higginbotham
Buena Vista

THE 1973 PRIMITIVE WEAPONS SEASON

By JOE L. COGGIN, *Game Biologist Supervisor*
DENNY MARTIN, *District Biologist*
GARY SPIERS, *District Biologist*



THE primitive weapons season was created to allow hunters with an interest and appreciation of the hunting methods and hardware of our forefathers the chance to hunt as they had when our country was young. It was thought that coonskin caps, buckskin clothes and stealth could be combined with an old bulky weapon of questionable accuracy and reliability to allow the few hunters that had been hunting with muzzle-loaders a chance to experience hunting deer as many of our ancestors had. After all, the bow hunter was allowed a special time to hunt with a weapon which definitely handicapped the hunter. However, it is the opinion of the writers that the only handicap presented by these weapons is their one-shot capacity. Almost every hunter interviewed claimed accuracy that equaled or even surpassed the accuracy of their modern high-power cartridge rifles. One man claimed he could consistently hit an egg at 50 yards with his .58 caliber open sight percussion rifle. As for the one-shot capability, few hunters with bolt action rifles get more than one shot at a deer. A scope certainly could be mounted on these weapons although none were observed.

The survey of weapons indicated a vast majority of new muzzle-loaders. Most were purchased just prior to the primitive season. The interviews also revealed that many hunters were unable to hunt because their ordered rifles had not been delivered in time. As the season is continued, the number of hunters will surely increase as will the number of deer harvested.

Last year's season, as does this year's, includes four Commission-owned game management areas located west of the Blue Ridge Mountains: Clinch Mountain—22,485 acres in Smyth, Russell, Washington, and Tazewell Counties; Gathright—18,392 acres in Bath and Alleghany Counties; Goshen—16,236 acres in Rockbridge County; Little North Mountain—16,603 acres in Augusta and Rockbridge Counties. This is a total of 73,716 acres available to hunters who like to hunt with muzzle loading rifles. The weapons

used during the 6-day season must be at least 45-caliber, fire a single projectile loaded from the muzzle and propelled by a minimum of 50 grains of black powder.

Game Commission personnel interviewed hunters on all areas to obtain data about the season since it was our first experience of this kind with these weapons.

The total harvest for all areas was 23 deer, according to preliminary data, and each deer harvested furnished 58.8 man days or 348.6 hours of hunting. The total man days for all hunters was 1,411; each man day consisted of 5.9 hours.

The first two days accounted for 68 percent of the hunting and about 10 percent by nonresident hunters. All hunters combined reported missing 33 deer and wounding two.

The Gathright Wildlife Area had more nonresidents than all other areas combined. All hunters averaged seeing one deer per hunter per day but succeeded in harvesting only four deer, all of these killed by resident hunters. All the hunters interviewed seemed to be pleased with the season, and many expressed the desire for it to be expanded into other areas.

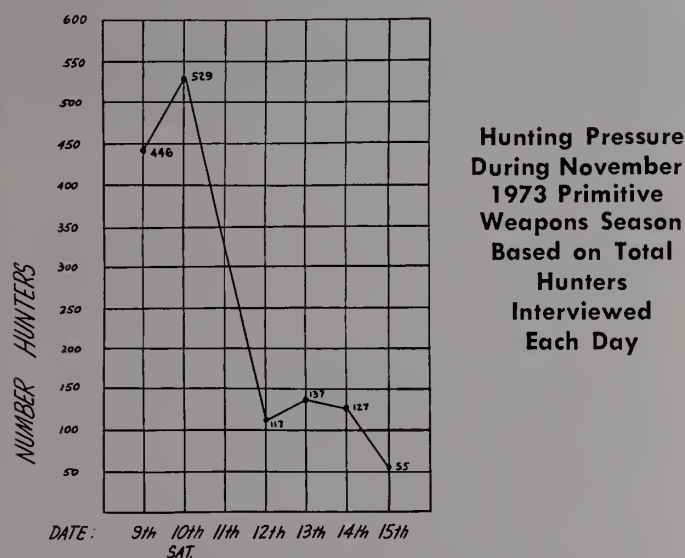
The Clinch Mountain Wildlife Management Area experienced the least hunting pressure of any of the four areas. Only three nonresident hunters used the area and the majority of the resident hunters came from localities within 30 miles of the area. The 171 hunters who used the area reported seeing a total of 70 deer and harvested three legal bucks. Two illegal kills, one doe and one button-buck, were noted.

Some very rugged terrain is included in the Clinch Mountain W. M. A., and there is a good population of black bear that have found the area to their liking. Bear season was open during the primitive weapons season here last year, and one muzzle loader reported taking a shot at a bear. However, he did not kill the bear and was not positive that he had hit it. Several hunters complained that their deer hunting was interrupted by the presence of the bear hunters' dogs in the woods. Since bear hunting will be prohibited on the area in 1974, there should be no such complaints.

Goshen and Little North Mountain Wildlife Man-

VIRGINIA WILDLIFE

agement Areas combined form the largest unit (approximately 33,000 acres) included in the primitive weapons season. It is also the closest unit to many of the large populated areas such as Richmond, Arlington, and Norfolk. Naturally, this unit was expected to get the heaviest hunting pressure and the graph substantiates this. However, the hunting pressure was much lighter than preliminary information indicated. It was reported that one gun dealer sold over 350 muzzle-loading weapons since the announcement of the season. Another dealer was unable to get "nearly enough muzzle-loaders." Phone calls requesting season dates and prime hunting area locations also suggested possible heavy use. Yet, monitoring the hunting pressure at eight check stations set up at the most heavily used access points showed that often less than 10 hunters were reported for the entire day. Some check stations reported only one hunter and one did not have any hunters on the last few days of the season. It was cold, but except for some wind the weather was generally good for hunting.



A total of 16 deer were harvested on the two areas. Approximately 730 man days of hunting effort (3825 hours) yielded 571 deer sightings, 21 misses, and 2 deer woundings without recovery. The totals were calculated with 16% increases, to include non-monitored areas, and are not expected to be actual figures except the total deer harvested.

Four groups of weapons were used. The Thompson/Center Hawkins percussion rifle was the dominant weapon, although a "Flinter" Hawkins was observed. Rifles of foreign origin and looking much like the Hawkins are included in this group; probably 50% to 60% of the weapons observed were of this group.

The second most popular rifle was the Harrington and Richardson Huntman with the "knock-out" breech plug. The larger caliber was more popular than the .45-caliber in both types of rifles.

A few rifles had been made from kits or from a com-

bination of old and new parts and a chunk of pretty wood. Some of these reproductions took a great deal of time and talent to construct. These hand-made reproductions make up the third group.

All the rifles discussed so far were reproductions. The fourth group was made up of original muzzle-loaders, probably of 19th century vintage. Only 10 originals were observed of over 450 weapons sampled. During interviews many hunters claimed to own originals, but because of their high value they made or purchased reproductions to use. Some put values well over \$1,000 on these old guns.

I observed only one hunter wearing anything close to "Davy Crockett" attire. He had a handmade deer-skin pouch, powder horn and carried a man-made flintlock. However, his camouflage hat, vibram sole boots, and hunting jacket gave him away as a quasi-modern hunter. Most hunters wore red or blaze orange clothing as they wisely do during regular rifle season. According to the original proponents of the season, the opportunity to hunt deer while wearing primitive clothing seemed an important part of the hunting experience.

Although not unique to the muzzle-loading season, some hunters felt that it was necessary to use trail bikes as a mode of transportation, generating some complaints. It is illegal to ride *unlicensed* vehicles on open access roads on Commission or U. S. Forest Service lands at any time. Equipment such as goggles, helmet, lights, and driver's license that is required for normal state highway travel is also required on these roads. Closed roads are not open to vehicular travel of any type.

This year the season has been backed up to November 4-9 to avoid overlap with small game season. The same areas are open with the same weapon limitations except that telescopic sights may not be used. The bag limit remains one buck with antlers visible above the hair, such animals to count as part of the hunter's license year limit.

Hunter Data for 1973 Primitive Weapons Season— All Areas Combined

Day	Total Parties	Total** Hunters	Total Hours Hunted	% of Total	Av. Hrs. Per Hunter per Day	Total Deer Seen
9	234	446	2,669	32%	6.0	304
10	262	529	3,009.5	36%	5.7	412
12*	60	117	734.5	9%	3.2	76
13*	58	137	862	10%	6.3	58
14*	62	127	841	10%	6.6	123
15	35	55	250	3%	4.5	51
Season Total:	711	1,411	8,366		5.9	1,024

* Based on projected figures for Little No. Mountain and Gathright based on a complete count for all days on Goshen and Clinch Mountain. These projected figures represent 16% of the total hunter man-day count.

** Does not indicate number of *different* hunters.

The Alpine Appalachian

Text & Photos by TONY DECKER
Marion

IF you like to hike in outstanding scenery, the recently relocated section of the Appalachian Trail in Grayson, Smyth, and Washington Counties is for you. Part of Mount Rogers National Recreation Area in Jefferson National Forest, this highest section of the trail in Virginia offers elevations over a mile, spruce-fir forests, rock formations, thousands of acres of open land, and a cool climate.

The relocation begins at Cuckoo Gap, a mile out of Damascus, and runs through fairly typical oak-hickory forest for 12½ miles to Big Hill on U. S. Route 58, where it begins the climb to Whitetop. Leaving Iron Mountain at 2,800 feet elevation the trail descends gently to U. S. 58 and crosses Straight Branch on a footbridge at 2,200 feet. The rest is uphill, but by a good tread at reasonable grades.

Of interest on the way to Big Hill are the N&W Railroad branch line up the beautiful gorge of Green Cove Creek, the tiny village of Taylors Valley, the rock slide with a cascade of good water nearby, and the high railroad trestle over the trail near Creek Junction. An abandoned farmstead half a mile from the trestle shows signs of use as an overnight shelter. Built of four inch by twenty-four inch slabs dovetailed together, the house and its log outbuildings also invite copperheads. Around a nearby spring, bluets, yellow violets, and bloodroot flower in late April and early May.

Big Hill, at 3,350 feet, represents a climb of about one thousand feet in the previous 7½ miles. From there, beginning on gentle country lanes to Forest Service property, then more rapidly, and finally very steeply on a temporary location, pending other arrangements

Snow is a hiker's hazard from November through April. Whitetop as seen from Mt. Rogers.

for a better route, the trail reaches the saddle between Beech Mountain and Buzzard Rock on Whitetop Bald.

At Whitetop the hiker has arrived in the alpine section of the trail. In clear weather, the next eleven miles to Pine Mountain provide expansive vistas.

The outcrop of Buzzard Rock is the first of many the hiker from the south will see. A pinkish rhyolite of volcanic origin, this rock is much harder than the surrounding sedimentary rocks. A government geologist I met that day said the rhyolite formation extending all the way to Pine Mountain was once much higher, but has been worn away by erosion over the ages. Its rugged formations add much to the alpine scenery.

The Whitetop Bald is an ancient natural opening. Much of it is carpeted inches deep with three-toothed cinquefoil, a unique plant of high open mountains and arctic plains. It does not occur on the other open areas of this section as they are all man-made. Mountain sandwort grows in rosettes or mats in rock crevices where nothing else seems able to take hold.

The trail does not go to the peak of the mountain, which is marred by a facility of the Federal Aviation Agency and closed off by a locked gate. A quarter mile side trip will put the hiker close to it, once he reaches the auto road, Virginia's highest, and into a spruce forest.

Wide vistas into Tennessee and North Carolina reward the hiker from anywhere on the Bald. Descending somewhat to enter the forest on the way east, he views Mount Rogers for the first time.

The descent to Elk Garden is through a mixed hardwood and spruce forest, with attractive fern- and lichen-covered cliffs and a few vista points. In spring this area is literally white and fragrant with uncountable millions of spring beauties.

At Elk Garden field, where Virginia Route 600 crosses the mountains, the trail is at 4,500 feet. Here the Virginia Highlands Horse Trail has its terminus.

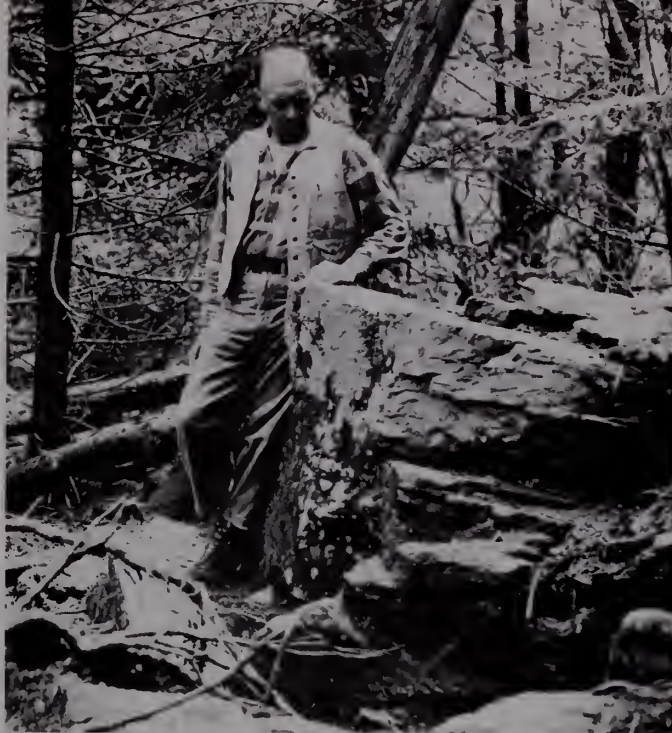
Together at this point, foot and horse trails promptly diverge to opposite sides of Elk Garden Ridge. The foot trail goes past more rock outcrops, over which ravens often soar. Cattle, on grazing land leased from the U. S. Forest Service, make it necessary to see that the gate is closed. Entering the woods on the far side, one crosses the fence by way of a stile.

Two miles from Route 600, Deep Gap Shelter is a typical three-sided log shelter with table, fireplace, refuse cans, and latrine. It is ideally located for an overnight stop by those who want to make a leisurely trip through the rest of the alpine zone to Old Orchard Shelter 7¼ miles away.

Not far beyond the shelter the climb to the summit of Mount Rogers begins, first in a northern hardwood forest, then in a spruce-fir type of considerable beauty. Off the trail it is next to impossible to step without walking on a variety of mosses, clubmosses, lichens, and ferns. The sun seldom penetrates, and there is a deep, damp silence.

The top of Rogers (5,729 feet) is a disappointment to many, being densely forested and with limited northward visibility only.

After leaving the spruce-fir type eastwards, a long slope covered with a relatively thornless blackberry is crossed, with unlimited vistas south and east. Here also the Catawba rhododendron begins, attractively interspersed with rock outcrops and evergreen trees.



This rock on Mount Rogers is Virginia's highest point.

At Rhododendron Gap spectacular scenery combined with masses of purple rhododendron, in bloom in early June, form a highlight of the entire trip.

From the Gap, where a sign proclaims the elevation to be 5,400 feet, a side trail leads south along rocky Wilburn Ridge, named for Wilburn Walters, a famed bear hunter of a century ago. It is about two miles on this trail to Grayson Highlands State Park (formerly Mount Rogers State Park) on Haw Orchard Mountain. This probably is the most worthwhile side trip in the entire area for those who have the time, as this is all open, with lots of rock, and unlimited vistas when the weather is right.

About a mile east of Rhododendron Gap a trail, once used for driving cattle to and from the high grazing lands, forks off to the north, steeply down to an old railroad grade which leads back near Old Orchard Shelter. This may save a mile but is not well marked. The extra mile to Pine Mountain, where the Appalachian Trail turns down to Old Orchard Shelter, is scenic and most worthwhile.

Old Orchard is one of the few shelters in Jefferson National Forest that offers an attractive vista. In late summer and fall, apples from the trees that give the shelter its name are a bonus.

Looking across Fox Creek Valley to Iron Mountain it is a hike of four miles to the point where the old trail is rejoined. In the valley below along Route 603, it is about a mile west to Grindstone Campground, where the hiker can put a fitting end to his high country experience with a hot shower in season (May to September, fee required).



Maps and further information available from:
 Forest Supervisor Headquarters
 U. S. Forest Service Mount Rogers National
 P O Box 4009 Recreation Area
 Roanoke, Va. 24015 Marion, Va. 24354

NEW HOPE for Claytor Lake

By JOHN L. BOAZE

FOR some years sportsmen and the Commission of Game and Inland Fisheries have been concerned about the Claytor Lake fishery. Various methods of increasing productivity have been tried.

Threadfin shad were introduced into the lake in 1964 and 1965 in an unsuccessful attempt to establish a forage fish, but the winters probably proved too cold for these fish.

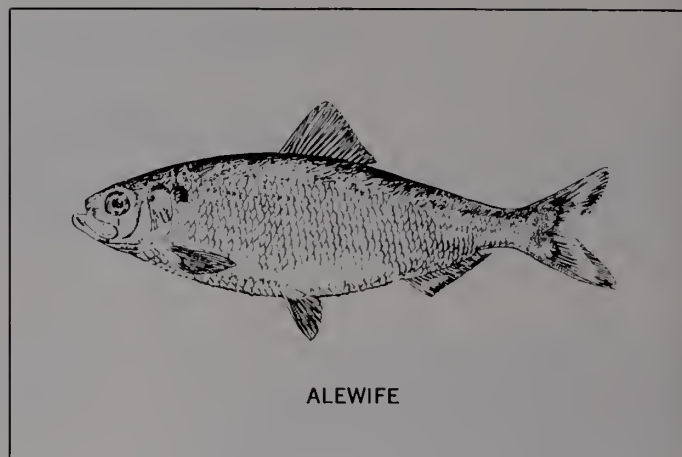
In 1968 and 1969, Claytor Lake received a generous stocking of 110,000 alewives. These alewives came from New Jersey. Therefore, they were accustomed to cold water temperatures.

The planktonic feeding members of the herring family (Clupeidae) have often been used as a forage species in fisheries management. Because of their high fecundity and small size, they strengthen the food chain length between the plankton and piscivorous game fish.

The alewife, which is being widely used as a forage species for both warm-water and cold-water fishes, originally was an anadromous species confined to the northern Atlantic coast of the United States. Landlocked populations have been established in the northeastern United States and Canada through introductions and by natural spread through the canal systems. The oldest known landlocked population of alewives is in Lake Hopatcong, New Jersey.

The alewives introduced in 1968 matured and spawned successfully in the summer of 1970. Again in 1971 and 1972 these fish were able to spawn successfully. These spawnings indicate that there will be a successful establishment of an alewife population in Claytor Lake.

During my study of the Claytor Lake fishery, which was supported by the Virginia Commission of Game and Inland Fisheries, I evaluated the impact of the newly introduced alewife on the fish population. Upon examining the stomach contents of various species of predators, alewives were found on one or more occasions in the following (number of stomachs examined in parentheses): walleye (64), white bass (43), small-mouth bass (8), channel catfish (20), flathead catfish



ALEWIFE

(18), black crappie (13), white crappie (11), and yellow perch (9).

Alewives were the only fish found in the 16 walleye stomachs containing food. The alewives taken by the walleye ranged from 3.0 to 7.4 inches in total length.

Thirty-four white bass stomachs contained food. Only crayfish were present in four of the stomachs; crayfish and alewives, in three of the stomachs; and only alewives, in 27 stomachs. Size range for the alewives taken by white bass was from 2.0 to 4.7 inches total length.

Although no conclusions can be drawn from the stomach analysis due to the small number of samples taken, some generalizations can be inferred. A large number of the predator species have taken the alewife as food one or more times. The popular food of the walleye in other populations is yellow perch which, although present in the lake, was not found in the 16 stomachs examined having food. White bass seem to be taking the alewife a large percentage of the time, although they are still utilizing the crayfish to some extent.

Now, how does this relate to the growth of the fish? The growth rates of walleye and white bass before and after the alewife introduction were compared to determine if the alewife increased the growth of these two popular fish. Although we detected no significant change in the growth of walleye before and after the alewife introduction, the number of samples taken prior to the alewife introduction may have been insufficient for a valid test. However, with the white bass, a significant increase was detected in age groups III and IV. These are the 10 to 14 inch fish. The only change known to have taken place in Claytor Lake, other than natural change due to the passage of time, is the introduction of the alewife.

The presence of alewives has increased the productivity of Claytor Lake, at least in the white bass population and possibly in other species. I believe that the use of the alewife as a forage fish is an excellent fisheries management tool in lakes previously uninhabited by a forage fish.

Now a fishery management biologist with the USDI Fish & Wildlife Service in Tennessee, the author was formerly a member of the Virginia Game Commission's fish division.

Who Really Cares?

by ARMINTA BRAASCH
San Lorenzo, California

HOW can anyone shoot a "Bambi"? Who really *wants* to? And then have it mounted and displayed in his trophy room as proof of his superiority? Not I. Nor will I ever understand anyone who does, including my husband. My husband and I both shoot the bow and arrow, but he is a hunter, along with several million other hunters in the United States.

I used to ask myself, "Why in the world does anyone enjoy killing?" But after considerable research into the subject, I discovered it is not the kill that pleases the hunter—it is the challenge and the chase. And in my research, I discovered some interesting, and probably little-known, facts that should be spread around.

FACT: Game and Fish agencies report that hunters have contributed over \$3.2 billion for conservation in less than 50 years. They further report that hunters are paying over \$145 million yearly for conservation, which means *they do more to help wildlife than any other group in America.*

FACT: Every time a hunter buys a federal duck stamp, the money is used by the federal government to buy and lease lands for waterfowl refuges and waterfowl production. Many different varieties of shore birds and animals which are not hunted share the benefits with game species. Six million dollars a year goes toward conservation from these stamps. Since the beginning of the program, almost 40 years ago, the stamps have raised over \$117 million.

FACT: Every time a hunter purchases a new gun or a box of ammunition (and beginning in 1974, any type of archery equipment), he is adding to conservation funds. This is possible because in 1937 hunters gave their support to a bill that provides an 11% excise tax on sporting arms and ammunition to be used to aid conservation. This money is used by the individual states to buy and improve millions of acres of land for the support of wildlife. This land, *paid for by hunters*, is enjoyed by all the public. Through this tax, hunters raise almost \$40 million yearly and have provided \$438 million since the tax was enacted.

FACT: The hunter's largest contribution to conservation is made every time he buys a hunting license. License fees are used to improve wildlife habitat, finance game management and conservation education, and support state game departments throughout the country. The fees from these licenses also benefit hundreds



of non-game species as well, and provide game departments with over \$100 million a year. Over the years, the hunters have added another \$1.6 billion in aiding conservation.

Yet who bears the brunt of the propaganda of the so-called "humane groups"? Who would these groups like to crush? The hunters. And what will happen to our conservation and wildlife programs if the hunters lose? Who, if anyone, will replace the income lost from the prohibition of hunting privileges?

Nathaniel Reed, Assistant Secretary of the Interior of Fish and Wildlife and Parks, summed it up quite well in a recent speech: "There are many ways to kill a living thing and Nature is often more terrible in its treatment of animals than man. There is no beauty in seeing a predator tear its victim to pieces, or to witness the slow agonizing death of a starving deer in a hard winter. Yet it is a natural way, even as a hunter's well placed shot is a part of the natural scheme. Man was and is a predator and a carnivore. Something has to die every day to sustain our lives. This is a fact that we hate to face in our plasticized, technicolor world, but death is an essential aspect of life for all living things.

"Yet man's modern technology has created some ways of killing far more insidious and horrifying than anything nature can serve up. In considering what is humane in treatment of animals, is it worse to cleanly kill a selected duck with a gun, or to cover it with oil, drain marshes so it can't eat or reproduce, or subtly poison it with pesticides or other chemicals?

"The issue of anti-hunting is a false one, because it sidetracks people from attacking the real threats to our native wildlife. We need programs responsible to all the people and all their needs. We need ways for the wildlife photographer, bird watchers, nature hikers and others to contribute to wildlife betterment. We must look at the priority needs of all wildlife and establish new objectives. Among these objectives must be a hard look at the future of sport hunting. Over 14 million people hunt in this country, according to the 1970 National Survey of Fishing and Hunting, compiled by the U.S. Fish and Wildlife Service. I believe legitimate sport hunting has a major role in wildlife management.

Because of man's changes in the environment, he becomes responsible for population control or harvesting and management of all forms of wildlife.

"One hunter once observed that if the bald eagle were only good to eat and came readily to decoys, it would not be in danger of extinction. He was less than half serious, but he knew it was hunters like him who had demanded and got the compulsory duck stamp to provide money for waterfowl refuges and who raised millions of dollars through Ducks Unlimited to restore duck breeding marshes. Incidentally, these refuges comprise over 30 million acres of land and harbor far more non-game species, including several endangered ones, than they do game animals or birds. The good hunter who does exist in reality, consistently puts his money where his mouth is—to the tune of over \$200 million a year.

"Whether a person chooses to hunt or not is a matter of choice. A true hunter, I believe, has a much greater reverence of life than those who may never have taken an animal's life. By necessity, the hunter becomes a part of nature—not an observer. He can interpret his unique knowledge of wild creatures properly for the enlightenment of all. The majority of our country's great conservationists today began their love affair with the wild world usually as hunters or fishermen. They've learned things that have been of tremendous value to all society. Let's not cut off this source of knowledge."

The answer to "Why does a hunter hunt?" is not simple. Why does anyone fish . . . or bowl . . . or play golf . . . or tennis? A part of the answer insofar as the hunter is concerned is the outdoor experience; part is the anticipation and success in pursuing a quarry; part is enjoying wild game at the table; part is working with a well-trained dog; and part is the pleasure of good comradeship with fellow hunters. No one answer will ever fully satisfy all.

And yet, how many anti-hunters do you know who are strict vegetarians? Most of them eat meat, wear fur coats or leather shoes. They insist that hunting is cruel but butchering domestic animals is not. And incidentally, it is estimated that in California alone nearly as many deer are killed by automobile as by hunters.

Many well-intentioned but poorly informed people feel that hunting is a cruel and inhumane activity. These are people whose opinions are frequently swayed by emotion rather than sound biological reasoning. The serious threats to sport hunting are posed by well organized groups who are asking Congress, state legislators, local jurisdictions and the courts to outlaw hunting. They represent people with little or no hunting experience and limited knowledge of wildlife management. So adamant are they that a threat also exists from them to outlaw fishing.

Their main argument is that hunting is immoral, that it endangers the survival of wildlife, and that hunters

are a bloodthirsty and trigger-happy group who constitute a threat to the public and to one another. Think about morality the next time you sit down to a steak or chop. Then think about who is *really* caring for our wildlife. And believe me, any hunter who turned out to be bloodthirsty and trigger-happy and/or a threat to other hunters would have to hunt alone. The true hunter is a true sportsman and is as anxious as the anti-hunters to have the undesirables weeded from the ranks. So emphatic about it are they that they set up their own set of Rules of Fair Chase, which are:

"No animal may be taken under any of the following conditions:

1. Helpless in or because of deep snow.
2. Helpless in water.
3. Helpless on ice.
4. Helpless in trap.
5. While confined behind fences, as on game farms, etc.
6. In defiance of game laws or out of season.
7. By "jack lighting" or shining at night.
8. From power vehicle or power boat.
9. Any other method considered unsportsmanlike."

In addition, some states have passed laws, with the backing of hunters, that any hunter obtaining a hunting license for the first time must first pass a stiff hunter safety course. Does that sound like a trigger-happy lot?

And lastly, you might look at it this way: Centuries ago, Nature's most intelligent and resourceful predator, man, discovered that it was much easier to guarantee a food supply by culling tame animals from a captive flock than by the riskier method of hunting wild ones whose speed and senses were superior to his. So certain animals were gradually converted to a form of benevolent captivity we called domestication. The sheep was selected—the deer was not. Then over the centuries, man's food gathering activities, like others, became even more specialized. No longer do we all gather and butcher our lambs individually. Most of us now pay others for this service. The practice has gone on for so long that, when we select a neatly wrapped package of lamb chops from the meat counter, we often forget where they came from or how they got there and part of their price goes to pay our specialized, proxy predator. We all pay others to do our "hunting" for us.

Frequently we hear from those who claim to weep for the fawn because his life may some day end at the hands of a hunter. But the odds remain in his favor—as much as 20-to-1 in his favor at times. More likely, he will eventually succumb to starvation, disease, harassment from your free-running pet dog, or a speeding auto on a superhighway we have recently cut through his range. In any event, few deer die of old age. If you had a choice of being born a fawn or a lamb, which would you choose?

What have *you* done for our wildlife lately?



And Falling Leaves

By ELIZABETH MURRAY
Charlottesville

Illustrated by Lucile Walton

IT is easy to take for granted that deciduous leaves are going to change color in the fall and eventually drop from the tree. Each year we are treated to a rich show of color from the bright yellows of the sassafras, hickories, birches and poplars, through the brilliant oranges and scarlets of the maples, pin oaks, scarlet oaks and gums to the deep dark red of many of the species of dogwood. Sometimes we stop and wonder about the mechanisms which bring about these changes, and the reasons behind them. To the questions *how* and *why* plant physiologists can provide some interesting insights and at least partial answers.

The color changes involve both the fading of original pigments, thereby uncovering other pigments which were present but previously masked, and the formation of new pigments. The simplest case is represented by leaves which turn yellow in the fall. The yellow pigment is a substance called *carotene*, which is present throughout the life of the leaf. However, during the active part of the leaf's life the carotene is masked by the presence of *chlorophyll*, the green pigment which is necessary for the production of sugars in the leaf through the process known as *photosynthesis*. When food production runs down towards the end of the year the chlorophyll begins to bleach and the carotene becomes visible. The chlorophyll is attached to proteins in the leaf cells. When these proteins break down as the leaf ages, the chlorophyll loses its stability, and the green color fades.

The formation of new pigment occurs in leaves which turn red and provides us with some of the most magnificent displays of the fall. No red is present in the typical summer leaf. Although some young leaves formed in the spring may contain red pigment, they

mostly lose it as they mature. One exception to this is, of course, the leaf of the copper beech. The red pigments newly formed in the autumn leaf belong to a different class of pigments known as the *anthocyanins*. Anthocyanin means blue flower in Greek and was the name given to the first pigment ever extracted from a flower, the blue cornflower, by a Frenchman F. S. Morot over 100 years ago. The word is now used for a whole class of pigments, some blue, some purple and some red.

In their solubility, anthocyanins differ from the green and yellow pigments of plants. Anthocyanins are water-soluble and hence are found in the watery sap of the leaf, whereas carotene and chlorophyll are soluble only in oils and organic solvents and are restricted to the little green chloroplasts inside the leaf cells.

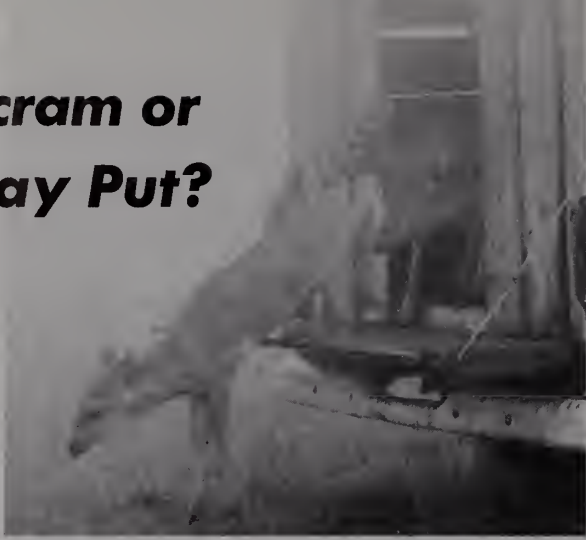
The formation of anthocyanin in the leaf depends on the breakdown of sugar in the presence of bright light when the phosphate level is reduced. For the normal breakdown of sugar in the typical summer leaf a high level of phosphate is required. However, in the fall many nutrients, including phosphate, migrate out of the leaf and into the stem. Under these conditions, the sugar breakdown follows a different chemical path which leads to anthocyanin production. In general the brighter the light, particularly when the temperatures are rather cool, the greater the amount of anthocyanin formed, and the better the show for us. It is a common observation that a lot of bright cool days in October produce the most brilliant fall show. Although this is partly due to the fact that autumn leaves show up better on a sunny day, fine weather also contributes to the actual formation of brighter colors. By contrast, in England, where the weather is usually mild and cloudy in autumn, the foliage is much duller. The colors are limited mainly to yellow and browns, the anthocyanins making an almost negligible contribution.

The role of phosphate in anthocyanin production is shown in another way. Crops which are grown on phosphate-deficient soil sometimes show unusual reddish or purplish leaves. This is recognized as a "hunger sign" by scientifically-minded farmers. Dr. Kenneth Thimann, professor of plant physiology at Harvard University, has grown duckweed on artificial media containing a lot of sugar in solution with very little phosphate, and induced anthocyanin production in the normal young leaf. Some pigment formed even in the dark, but the process was greatly increased by artificial sunlight.

The color changes of autumn leaves do not in themselves appear to be specially beneficial to the tree. The leaf is, as it were, going about its normal end-of-the-year jobs, winding up its food-making industry and preparing to remove itself altogether from the tree before winter; and the changes in color are a by-product

(Continued on page 17)

Scram or Stay Put?



By W. ALAN GUTHRIE
District Game Biologist

RESTOCKING areas where deer and turkeys have been extirpated, or eliminated for all practical purposes, is an approved wildlife practice. In both cases, live-trapped wild animals or birds are used. For several years Game Commission personnel have removed deer from the Radford Army Ammunition Plant in order to prevent an over-population of the animals; since, due to security reasons, hunting cannot be allowed. Many southwest Virginia counties now have established deer herds using these excess animals.

During the 1972 trapping period, it was decided to mark 50 of the deer with ear tags and release them as a research project, to learn later what percent of such released animals were legally harvested. For convenience the study was conducted in Giles County and is known as *The Deer Tagging Study*. It was not a high priority Game Commission study, but such minor studies often yield valuable and interesting facts to the average sportsman. This particular research produced some facts which we really had not anticipated, and we feel Mr. Sportsman would like to know about them.

We expect a percentage of animals to become victims of poachers and vehicles, as well as other miscellaneous causes of death—dogs, injury, trains, fences, etc. This study pretty well confirmed our thinking along these lines.

Also, we expect animals to move some after being released. Our selected release areas may not be 100% to the liking of deer. Naturally, he will move to find some place that suits him. But how far will he go? This we did not know for sure. We have a better idea now, but we still aren't sure because the only data we have was obtained from animals whose traveling days are over, period! Perhaps he hadn't yet arrived at a Utopian spot before he arrived at the Promised Land!

Let me set the stage for you. We used a gridded map of Giles County to choose ten release areas by random selection. At each site five tagged deer were released. Following the release we could only sit back and wait

until a tagged animal showed up as a statistic, dead of course. Following is a listing of animals from which ear tags were returned:

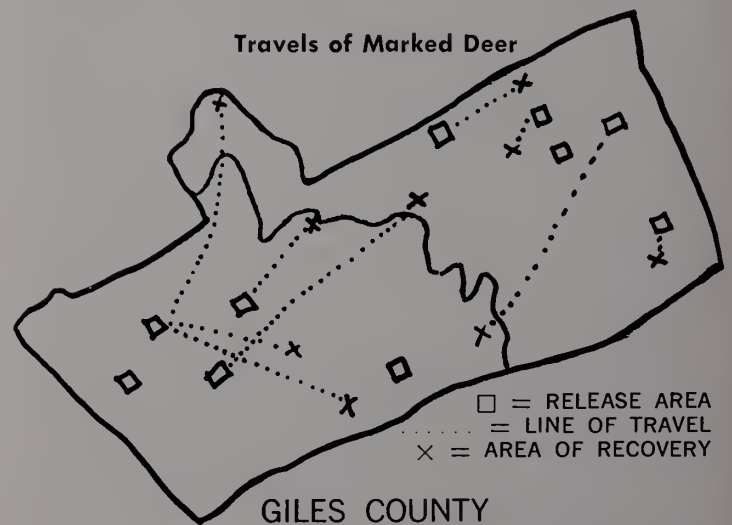
- | | |
|----------------------|----------------------|
| 1. Killed by poacher | 6. Killed by poacher |
| 2. Killed by truck | 7. Killed by poacher |
| 3. Killed by car | 8. Legal kill |
| 4. Killed by poacher | 9. Legal kill |
| 5. Killed by poacher | |

In other words 9 of 50, or 18% of the released animals, were heard from again. Two (4%) were legal kills, 2 (4%) fell victim to vehicles, and 5 (10%) were shot illegally. This is the information we expected to derive from the study.

Most research projects yield "side information" or facts we didn't expect. In this case we obtained some "scram or stay put" information on deer. It is now fairly obvious to me that deer believe in the scam theory! The accompanying map of Giles County indicates the randomly selected release sites. Dotted lines show the general direction of travel from each release site for each recovered deer, and the area where the deer was eliminated.

Obviously, 41 of the 50 released deer have not been recovered. They may still be alive or may be dead, but the ear tags have not been returned. An illegally killed animal which the poacher managed to get out of the mountains probably will not show up in our statistics. Poachers aren't always geniuses, but I doubt that they'd be stupid enough to return a tag on a deer they killed illegally! Other animals may have died or been killed and were never found.

All the deer we are releasing now are being ear tagged for later identification. So perhaps releases in other counties will yield more information for us in the future. But from this pilot study, I'd be willing to bet that you could take a vote from deer being released and ask them to choose between staying put at the release site or electing to scam and you'd get an overwhelming SCRAM vote!



CONSERVATIONGRAM

Commission Activities and Late Wildlife News ... At A Glance

THERE GOES THAT BROWN TROUT RECORD AGAIN. For the third time in recent months, the state record for brown trout has changed hands. This time the lucky angler was Al Teachout of Greensboro, North Carolina. Mr. Teachout's brown trout, from the Smith River as were the others, weighed 14 pounds 6 ounces—makes you wonder just how large a brown trout can grow in Virginia.

DISMAL SWAMP TO HOLD DEER HUNT. Deer hunters, 120 in all, will be afield this fall in the Dismal Swamp National Wildlife Refuge. The controlled hunt will be held on October 5, 12, 19, 26 and November 2, 9, 16, 23, and 30. Hunters were chosen by drawing in late September and will hunt under regulations governing deer hunting in Virginia as well as special refuge regulations.

GAME WARDEN ATTENDS F.B.I. ACADEMY. Virginia Game Warden Charles Hunter recently graduated from a three month long school held at the F.B.I. facilities on Quantico Marine Base, Virginia. Warden Hunter is the first game warden to attend this course while in service. The extensive 12 week session covered most phases of law enforcement and included considerable physical training as well. Warden Hunter's attendance at the F.B.I. Academy is the first part of a program to upgrade training of Game Warden leaders.

COBB ISLAND PURCHASED BY STATE CONSERVANCY. The Virginia Wildlife Federation reported recently that Cobb island, one of the last privately owned links in the chain of Virginia islands along the state's Atlantic Coast, was purchased by the Conservancy after four years of involvement. The 2,000 acre area of white sand beach, dunes and marsh cost \$600,000. Beginning with Godwin Island in 1970, the Conservancy has acquired six major coastal barrier islands and three of the secondary islands. The islands, which front the Atlantic for 32 miles, are the last classic barrier islands remaining virtually untouched along the eastern seaboard. Funds for the purchase came from the Mary Flagler Cary Charitable Trust.

VIRGINIA'S WETLAND GAME BIRDS NOW AVAILABLE. The Game Commission is happy to announce a new publication which depicts in full color the important wetland game birds which are available to hunters in Virginia. Featuring the colorful paintings of J. W. Taylor and a superb text by game biologist Charles Gilchrist, the eight page publication is a must for waterfowlers in the Commonwealth and will be interesting reading for anyone fond of our abundant birdlife. Copies of VIRGINIA'S WETLAND GAME BIRDS are available from the Game Commission at 4010 West Broad Street, Richmond, Virginia 23230.

LAUNCHING RAMP DIRECTORY DUE SOON. A full color map showing all boat launching ramps maintained by the Commission of Game and Inland Fisheries as well as an up to date listing of all commercial marinas in Virginia will be available soon from the Game Commission. Over a year in the making, the map will be the most up to date source of information on where to launch a boat in Virginia. The marinas listing will also tell the reader about the services offered by each establishment along with the specific location. The launching ramp and marinas map will be available by early 1975.



CATCH YOUR

By GERALD ALMY
Arlington

THE most crucial item in a game fish's diet is fish. These fish are most often minnows, although sometimes adults will eat fry and fingerlings of their own and other species. In fact, once I found a 6 pound largemouth thrashing on the surface, choking on a one pound bass it had tried to swallow.

Luckily for the angler, though, bass and other game fish don't always demand such an enormous meal. Often they are happy to ingest a 1-6 inch minnow.

Lure makers have, of course, recognized the dominant position bait fish hold in a game fish's diet. We are inundated with minnow imitating lures—from plugs to jigs, spinners to streamers, spoons to spinnerbaits, thousands of minnow imitating lures vie for the money of the bewildered angler. And indeed, many of these lures are potent fish catchers.

But there are times when only the real McCoy will stir up a lethargic bass or an uncooperative trout. When this happens, the only answer is to get yourself a batch of lively minnows and give the fish what they want.

This can easily be accomplished by a stop at the local bait shop. But why not catch your own? Purchased minnows are expensive and, not native to the waters you plan to fish, don't have the natural appeal of the stream or river caught minnow. They are seldom as strong as creek minnows either, and will not maintain their liveliness on a hook the way a "native" will.

The best place to catch minnows is in small rural streams which can usually be located near your fishing destination or along the route somewhere. Virginia has many excellent minnow creeks.

The one you choose should ideally be three to six feet wide and not over four feet deep at any point. Streams smaller than this seldom support a significant population of minnows in the sizes needed for fishing bait. Those wider than six feet are too large to be seined by a single person and often have enough game fish to make minnows scarce.

For equipment you just need a seine and a minnow bucket or styrofoam ice chest to put the minnows in—both can be purchased for under \$10.

The seine you buy should be from six to ten feet long and four feet high. Six or eight feet will probably be the easiest length for the novice to handle. Once you get experienced a little you may want one slightly longer. Seines can be purchased at most any sporting goods store. Attach the two strings extending from each end of the net onto two discarded butt sections of cane poles, or cut a broomstick in half and use these pieces for your handles.

Now you are ready to seine, provided you've uncovered a respectable creek and gained the landowner's permission to catch a few minnows.

Seining is really easier than it may look to those who haven't actually tried it. Just be sure to keep the lower edge of your seine—the part with the weights attached to it—on the bottom of the creek bed or the minnows will escape by scurrying under the net. Work quickly and carefully.

Scoop the whole pool if it is only five or ten feet long. If it is bigger than this, concentrate on one section of it and make a quick sweep of that area before returning to the shore. Be sure to follow through with your sweeping motion until the bottom of the seine reaches the shore edge, or your quarry may escape.

Most minnows will be found in the deeper pools during spring, fall, and winter months; in summer many of them spend some time in the riffles and small rapids leading into pools where they find cooler temperatures and increased oxygen concentrations.

If you're after big minnows, though, it's best to stick with the deeper pools even during summer months. The minnows caught in riffles will seldom average more than an inch of two long—ideal for crappie, but far too small for a bass or muskie.

One other way of catching minnows that can be productive is to go after them at night on the edges of rivers and lakes. This method requires two people: one to shine the light and one to do the seining. But what a plethora of bait fish you'll discover! Thousands of minnows are there for the taking.

An average haul—about three dozen minnows.



OWN MINNOWS

Have your partner shine the light along the edge of the river or lake, about a foot or so in front of your seine as you move deliberately upstream six or seven feet and then quickly bring the seine in to shore to finish the haul. Most likely your net will be filled with thrashing bits of silver: lively shiners that are joyful bounty indeed for the minnow fisherman.

Minnows seined at night in this manner will generally all be the same size because they are traveling in schools. During the day, though, if you are seining a creek, the seine is liable to contain minnows anywhere from one to eight inches. The ones you keep should be determined by the species of fish you are going after. For trout, in most cases, a minnow of $1\frac{1}{2}$ - $3\frac{1}{2}$ inches is optimum. Crappies like slightly smaller minnows, generally from one to two inches. The common black-nosed dace minnow is preferred by crappie and trout.

A worm or small popper will usually outfish a minnow when angling for bluegills, but I have tempted some hefty bream with one-to-two inch creek minnows floated beneath a tiny bobber.

Rock bass, which thrive in the rocky river habitat commonly associated with smallmouths, will gobble down pretty near any sized minnow you drift near them. But the best bet for these scrappy fighters is to stick with those from $1\frac{1}{2}$ -3 inches. The rockbass, or "goggle eye" as he is known locally, has a large mouth and loves to stuff it with squirming minnows.

Once I ran into a school of slab-sized specimens of this fish on the Shenandoah River bunched up in preparation for spawning. I had some super-fast action using the minnows I had intended for smallmouths on these emerald gems. Before darkness forced me to wade

Keep handles touching bottom, arms spread, and follow through all the way to the shore.



back across to camp I had battled with 43 of these rod benders. Most were returned to finish their breeding, but a few ended up in the frying pan that night.

For bigger fish you need a bigger bait. I generally like to use as large a minnow as I can find for bass. When wading a river for smallmouths you'll do well with three to five inch minnows, while largemouths will grab even larger bait fish if you can get them.

The same goes for striped bass. Gizzard shad, which sometimes get to be 12 inches long, are a regular item in the diet of both the rockfish and the largemouth in the large impoundments where these fish are found together. A good rule of thumb when bassing with minnows is "the bigger the better." These fish are used to feeding on good-sized shad and might not be tempted by a scrawny little black-nosed dace.

The same rule of thumb applies for the toothy pickerel. Large wounded minnows seem to incite the meanness of these fish and often bring vicious strikes from the primeval-looking monsters. It's true that the largest pickerel I ever caught myself, a 4 and $\frac{3}{4}$ pounder, took a tiny minnow of an inch and a half which I had been dunking for crappies. But by and large you'll do best with minnows from $2\frac{1}{2}$ -6 inches for "jacks." Walleyes also like a large minnow—about the same size.

Once you've caught all these minnows, though, you're faced with the task of keeping them perky and fit so they'll wiggle on your hook and tempt the game fish you are after. A conventional metal or plastic minnow bucket will keep perhaps 80 or 100 medium-sized minnows alive for 10 or 20 minutes, but if you have more than this, or must transport them for a longer period, a styrofoam ice chest is what you need. The styrofoam material retains the stability of the oxygen content and temperature of the water: the two vital factors in keeping minnows alive and healthy.





GET YOURSELF IN SHAPE

By WILLIAM L. HERMAN
Professor of Physical Education
Slippery Rock State College, Slippery Rock, Penn.

IT is a sad fact that this hunting season will be the last for some individuals who take to the woods.

Some of them will have to be carried out—victims of heart attack. It happens *every* year. Many other hunters will subject their hearts to dangerously stressful situations that are unhealthy, foolish, and unnecessary.

Most of us take much better care of our hunting equipment than we do of our bodies. We all know of hunters who sit behind a desk all year long and engage in little or no strenuous physical activity until deer season opens. The combination of physical work and excitement that takes place during big-game hunting subjects the unconditioned heart to a burden that could be (and in some cases is) fatal.

The author maintains that there is no reason for hunters to take such a risk. They should make an effort to keep themselves in good condition during the entire year. This is the best insurance against heart attack due to the unaccustomed physical activity that occurs during hunting season.

If you are one of the majority who does not maintain a satisfactory level of physical fitness during the entire year, it is recommended that you get yourself in shape before hunting season begins. Your life could depend upon it.

First, it is wise to have a physical examination to ascertain your health status. Upon approval of your

doctor to engage in a shape-up program, you should begin the project on a gradual basis. Do not attempt to accomplish a miracle! Remember, you are interested in a healthy heart for hunting; you are not training for the marathon! An individual who has lived a sedentary life can not and should not strive to become physically fit for hunting in a few short days.

Approximately 10 minutes per day of sustained strenuous physical activity is sufficient at the start. Strenuous physical activity is defined as activity that causes the heart to beat at a rate faster than the normal resting rate. Some of the best activities to use in your shape-up program include bicycling, hiking, jogging, swimming, tennis, splitting logs, and other physical activities that get your heart rate up for a period of time. If you do not have a place to do these activities, one can always run in place (stationary running) in the bedroom, basement, or garage.

After several weeks of conditioning, you should gradually increase the amount of time for exercising (sustained strenuous physical activity) to approximately 20 minutes per day. There is little need for most hunters to increase the amount of time beyond this in future weeks.

A sportsman cannot make better use of his time and effort than in getting and keeping himself in shape. The gamble he takes by not doing so is one not worth the risk. The stakes are too high. Get yourself in shape! Hunt again next year!

of the chemical changes involved in the necessary business.

Shortly after a leaf begins to lose its chlorophyll, it also starts to lose its ability to retain water in the cells. Instead of being stiff or "turgid," the leaf becomes limp or "flaccid." The leaking water soon evaporates leaving the leaf shrivelled and crispy and finally the now dead leaf will fall from the tree.

The falling of leaves is of definite advantage and is, in fact, a necessary adaptation of all deciduous trees to more northerly climates where there is a big difference between summer and winter weather. Cold winter temperatures would kill soft broad-bladed leaf tissues and the frozen ground would make it difficult for the uptake of sufficient nutrients and water to keep the leaves growing and turgid. So the tree gets rid of its leaves which in winter conditions would be a liability—and enters a period of dormancy until the kinder weather of spring enables it to leaf out with its "food factories" again.

The mineral elements removed from the attached, slowly dying leaf are carried into the permanent structures of the tree. The translocation fluid containing these minerals moves down the tree and is stored in the woody tissues and in the root. Concurrently, carbohydrates, necessary to provide food for the initial growth the following spring, are also being removed from the leaf and stored. Trees which flower before the leaves appear, such as shad, dogwood and cherry, are in special need of this stored food, since they need instant energy before their leaves have started to photosynthesize and manufacture new food for the year. A tree's bark and the scars which form over the places left by the shed leaves provide good insulation for a wintering tree so that it can withstand the winter climate and guard its resources until spring.

Some of the chemical processes leading up to the decay and shedding of leaves have started long before any outward changes are visible. The transport of nitrogen to storage areas in the woody structure begins in the early summer. This gradually leads to a decrease in some of the proteins which are manufactured in the cell. When the proteins which form the enzymes for photosynthesis are decreased, then carbohydrate manufacture is reduced, and this gradually leads to all the other changes in the autumn leaf described here.

Instrumental in the actual casting off of leaves is another group of organic substances known as plant hormones. Basically, three of these promote growth and retard senescence and the fourth, abscisic acid, stunts growth and speeds up senescence. In the early stages of a growing leaf only the first three are produced, but the shortening of day length after the middle of June triggers the production of abscisic acid and slows down

the formation of the growth-promoting hormones. Gradually the balance becomes tipped away from leaf growth and towards leaf aging and death. Day length is an important causal factor. Trees which normally shed their foliage annually in the north may retain their leaves all year long in Florida, where day length varies very little between summer and winter.

Although day length is known to be an important factor in leaf fall, the actual mechanism by which leaves are shed is still not wholly understood. Leaf fall is not induced simply by increased production of abscisic acid. It is rather the result of a delicate balance between the abscisic acid in the old leaves which are ready to fall and the growth-promoting hormone or auxin which is still being produced at the tip of the branch or twig. In deciduous trees this balance is achieved almost synchronously for the whole tree.

Evergreen trees, which retain chlorophyll-filled foliage throughout the year also shed their leaves or needles. They do not do so all at once, so that there is always some greenery on the tree, hence the term *evergreen*. Some do most of their shedding in late fall along with deciduous trees; some shed at other seasons of the year, such as the hollies which lose most heavily in the spring, and some shed uniformly all year round. Evergreen leaves, in general, have a thick outer cuticle, the epidermal cells themselves are thick-walled, and there is an extra layer called the hypodermis. Stomata are much deeper than in deciduous leaves, the vascular bundles are surrounded with a well-defined sheath and the sap of the leaf is less watery and more resinous. These properties make the leaves much better equipped to withstand the rigors of a winter climate.

It is interesting to think a little bit about these normal annual events which are happening in our trees' lives, and gratifying to know that they are going to go on happening whether we think about them or not! In Virginia we always have a good fall, and if we get some of those lovely crisp fine days in early October, we can expect an extra and spectacular show of reds in that stolen later part of the month which, if it is fine, we call Indian summer. The Blue Ridge Parkway and Skyline Drive are the most popular places in the state to visit for autumn foliage. Some hickories are brilliant yellow. The blackgums, *Nyssa*, are a wonderful clear red. The shrubby sumac, which normally is rather an ordinary roadside plant, comes into its own with a bright russet show. The different oranges of so many of the maples are produced by a combination of the yellow and red pigments, carotene and anthocyanin; and there are a host of other shades and hues to marvel at. The Parkway is not the only place to go for fall sights. They are all around us at this time of year, and everyone should be urged to get out and admire them for themselves.



An Earring for Elmer

By ROBERT H. GILES, JR., *Professor
Department of Fisheries and Wildlife Sciences
VPI&SU, Blacksburg*

ELMER was one of my chipmunks. He was one of 54 that I knew intimately. His sister had bitten me. His cousins had scolded me. His son had become so excited by my activities he went into shock and almost died.

All of my chipmunks were free-roaming, beautiful creatures of the old forest in which I was doing research. A flash of rust-red here, a sparkle of black eyes there, a toothy chatter from the rock pile were all signs of life not just of the animal but of the forest itself. They were the pulse of the forest like the signs of breathing or the throbbing vein of a sleeping patient. The chipmunks were a life-sign of the big woods.

I was observing chipmunks and many other wild animals of the forest in an effort to discover what effects a pesticide application may have on them.

I had scattered through the forest, in a regular grid system, box traps that I set and checked daily. Each day I would find my friends in the traps. (I'm now convinced it was only a one-way friendship.) The traps were large and wire covered. Seeing a chipmunk in a trap from yards away, I would approach cautiously so as not unduly to excite him. They were usually pretty excited. My creeping probably did me more good than it did the animal. I would lay a burlap bag over the trap to calm it. It would usually stop its wild racing around the trap. I would then place a cloth funnel over the door. At the end of the cloth funnel I had sewn a "hardware cloth" or wire funnel.

When I opened the sliding door of the trap, the chipmunk saw a hole of light at the end of the funnel. He would usually dash out of the hole. The big surprise, of course, was that he would have wedged himself into the wire container. I'd then wedge a piece of cloth in behind him and could examine him without fear of being hurt or hurting the chipmunk.

I trapped most of my chipmunks in this fashion. I would collect records on their sex, age and parasites, and whether they had been captured before.

How would I know? From the earring I gave them the first time I captured them. Much like the fashionable ring for a pierced ear, each ring has a distinct number. By recording the number from each chipmunk I could tell where it had been trapped, where it roamed, and how long it had been in my study area. The numbers soon became familiar. Elmer was 164. Rather, 164 was soon Elmer.

Elmer was addicted. In the field of wildlife management, trapping and retrapping is done to enable population size to be estimated. The math is quite complicated, but it works. The idea, in general, is that the number of marked animals among those captured on one day approximates the ratio of all marked animals to the total animals in the woods. One problem with the technique is that if a marked animal is recaptured an abnormal number of times he can bias the population estimate.

Elmer biased our estimate. He was addicted to the trap. Why, I don't know. Maybe it was the bait. (I liked the peanut butter mix.) Maybe he liked the "clang" of the falling trap door. I don't know. Maybe he liked running through the funnel and having me fool around with his ear trying to read the number.

Elmer was one of the pleasures of wildlife research but also one of the real problems. He is an example of how improved techniques are needed to study wildlife, how questions remain—from trap spacing to computer analysis of trap-retrap data on up to the fundamental questions of the very life and pulse of the forest and man's effects upon them.



Look closely to see Elmer, on one of many visits to the trap.



The Red-cockaded Woodpecker

By JOHN W. TAYLOR
Edgewater, Maryland

DEEP in the pine forests of the South lives the red-cockaded, a bird which may soon become the victim of its own enigmatic way of life. Over-specialized to the extreme, it nests only in pines infected with a unique fungus disease. This affliction, red heart fungus (*Fomes pini*), decays the heartwood, but does not kill the tree, thus furnishing the woodpecker with ideal nesting sites and a plentiful food supply. Strangely, the bird cannot seem to adapt to other ecological conditions.

Moreover, since the disease only attacks mature trees, eighty years or older, and since the territory required by a pair of the birds may be 100 acres or more, suitable habitat was limited even in pre-colonial times. Now, with urbanization and modern forestry methods, there is just no place left for a creature so peculiarly non-adaptable. Its demise has been hastened by the management of the southern pine forests for timber, with the promotion of even-aged stands, crop rotation and the removal of trees for sanitation and salvage.

To keep the red-cockaded with us, it will be necessary to leave unharvested patches of full grown pines, and to be more selective in removing damaged and weakened trees. Such management techniques would help other wildlife as well, and keep the ecological scales in closer balance. Also suggested is the use of fire to retard the undergrowth in pine woodlots, a practice that would benefit the quail population as well.

Credit for much of what is known about the relationship of this woodpecker with the red heart fungus goes to Mr. C. C. Steirly of the Virginia Division of Forestry. Puzzled over the sporadic distribution of the bird, he spent long hours afield before unravelling the mystery. His knowledge and experience as a forester finally furnished a solution to the riddle: he found them nesting only in diseased trees in widely separated parts of the southeastern counties. He noted them in various parts of Southhampton County, in Isle of Wight and Nansmond Counties, and less frequently in Sussex County and Prince George County. But most of his field work was done more than twenty years ago, and the birds have now disappeared from much of their former range. Until the early fifties they were present on the Eastern Shore north to Dorchester County, Maryland, and there are several records for the barrier islands (Assateague, 1939 and Cedar Island, 1923). Some individuals show a tendency to wander erratically as there are specimens from as far west as Albemarle County. And, almost unbelievably, a pair showed up this past spring at the Patuxent Wildlife Refuge near Laurel, Maryland, a hundred miles from any previous sighting.



A clear cut on the Jefferson Forest.

OF all the management programs on the Jefferson National Forest, the coordinated timber management program benefits wildlife most. Its beneficial effect over large acreages has a greater impact than any localized wildlife development program. Certain wildlife species are benefited immediately after a timber clear-cutting whereas other wildlife species are benefited more from stands of mature trees. Proper interspersation of both conditions is imperative. To maintain a sustained yield for both timber and wildlife resources at high output levels, a good distribution of standing timber at different ages in a variety of timber species is needed. It is at this point that timber and wildlife coordination—a key word in managing these two resources—comes into the picture.

Most hardwoods can be managed under two basic methods or silvicultural systems. One is the all-aged system while the other is called even-aged silviculture. Both systems feature trees of all ages. The all-aged system features trees of each age class or large, medium, and small diameter trees on every acre. Cutting is usually planned to maintain this distribution. The even-aged system requires intermediate thinnings and regeneration, either by clear-cutting, seed tree, or shelter wood cutting of mature timber. In these units or areas groups of trees, all the same age, then grow up together in stands. These small homogeneous stands are distributed throughout the District. Latest timber research upholds the advantages of the even-aged system. To satisfy requirements of most wildlife and obtain a sustained yield of timber products, the even-aged system of timber management, properly coordinated, furnishes an excellent opportunity for balanced resource management.

Most trees require full sunlight for optimum growth

Can We Have TIMBER and WILDLIFE Too?

By PAUL A. SHRAUDER

Wildlife Staff Officer, Jefferson National Forest

and reproduction. This includes those tree species that must have sunlight to grow, called intolerant species, and those species that can grow in partial shade, called mid-tolerant trees. Most desirable timber species in Virginia, including excellent mast producing timber species, require sunlight to reproduce, grow, and yield high mast supplies. Acorns of such intolerant species as bear oak, scarlet oak, and chestnut oak sprout and then die back within three years unless they receive sunlight. The more tolerant species grow poorly under shade, but continue to live for years. When sunlight reaches them, they develop quickly and produce many fruits. Clear-cutting under even-aged silviculture satisfies this light requirement.

In managing timber resources through the even-aged system as practiced by the National Forests, desirable habitat can be planned for individual stands through coordinated timber harvest. Needs of wildlife are supplied by patterning stand types or groups of associated tree species and age classes through proper selection of cutting practices and favorable timing. This also includes limiting size of stands, spacing the clear-cuts, setting timber species composition, favoring certain wildlife food trees, and deciding on rotations or tree maturity and frequency of cutting. The practice of reducing the size of clear-cut to 50 acres or less, spacing and linear shaping of these clear-cuts are mandatory coordination measures carefully considered on each sale.

Other wildlife benefits of even-aged management include management of individual species. Management opportunities ranging from quail, deer, grouse, rabbit and dove habitat following clear-cutting to later management of turkey and squirrel are possible during a rotation, depending upon the forest type, age class, and distribution of timber stands. Game species are selected and promoted throughout the rotation, depending on overall habitat suitability, public demand, and recommendations by biologists of the Virginia Commission of Game and Inland Fisheries. This is done on the Jefferson National Forest at the present time using the Extensive Forest-wide Wildlife Habitat Survey as a basis.

Using deer as an example, populations soar when their habitat is excellent. This means that food must be available throughout the year: mast and other fruits in the fall and winter, green forage and woody browse in the winter, new browse growth, forbs and grasses in the spring, and fruits, berries, and herbaceous vegetation in the summer. Food quantity and quality depend upon the length of the timber rotation. Squirrels are dependent on hard mast supplies such as acorns while turkey, quail, and grouse readily utilize these foods resulting from long rotations (period from seeding to clear-cutting). Short rotations will reduce mast crops while increasing the amount of browse. The requirements of other consumptive game species such as bear, turkey, grouse, and squirrel as well as non-game species and endangered species are carefully considered with the necessary coordination practices put into effect on each and every sale.

Clear-cutting affects the production of small mammals, which usually goes unnoticed. Research conducted in the West, for example, has revealed an increase in the number of deer mice on a clear-cut area followed by prescribed burning. Although these numbers fluctuated widely and irregularly, they did increase from 1 to 13 animals per acre. Songbird production is also affected through clear-cutting. Research found clear-cut areas to be increasingly attractive to many birds. Prairie warblers and field sparrows are found in large openings, while juncos generally nest at high elevations in clear-cut areas. Other species that benefit from logging are the yellow breasted chat, rufous sided towhees, and golden winged warblers. The Southeastern Experiment Station at Blacksburg is heading up several research projects on the Broad Run management area of the New Castle Ranger District. Their studies have shown that more birds nest in dense, young stands than in older timber. A bird watcher can find the bird species he wishes to see by selecting certain age or type of stands for observation.

Even-aged silviculture can adversely affect the fishery resource. Properly handled, however, logging with clear-cuts under even-aged management has less adverse impact on water quality than logging under the all-aged system. This is due to fewer active roads needed in the watershed and concentrated in smaller areas. Roads are used less frequently and sowed to grass when not used to minimize erosion. More water reaches streams from clear-cuts than from mature forests, causing greater stream flows. To maintain cool stream temperatures, particularly for trout, and maintain a pleasant atmosphere for fishing, wide buffer strips of shade trees are retained between the streams and clear-cut areas.

Other examples of coordinating features a wildlife biologist may recommend in addition to retaining the shade and filter strips of uncut timber along trout streams are reserving valuable wildlife food or cover

areas such as grape clumps; rhododendron thickets; bear oak areas; protecting den and nest trees for squirrels, wood ducks, woodpeckers, and other species which require them; establishing a pattern of stand ages favoring many wildlife species; providing roosts and cover for grouse and turkey; and developing wildlife improvements such as cutting timber along edges, cross draining, and seeding a logging road at the same time that a timber sale is made.

To provide further assurance that wildlife will benefit from a coordinated approach from the even-aged system on the Jefferson National Forest, the Virginia Commission of Game and Inland Fisheries biologists and game managers review plans and timber programs and make any recommendations they feel beneficial to the wildlife resource. These trained wildlife personnel are brought into the planning process in the initial stages.

Even-aged management will not create optimum conditions for both wildlife and timber on every acre; but after working with this system of management for several years we are convinced that, if properly coordinated, the even-aged system will produce more game and more timber on the same land than any other system known at present. The objective in wildlife planning is to manage forest land for one or more wildlife species best adapted to it in keeping with local situations and needs. The kind of game favored in any one unit area is not necessarily fixed, but may change gradually with time and practices on the ground. An example is a new hardwood clear-cut supplying browse for deer today but which, in 50 years, will become good squirrel habitat.

In some stands such as rich mountain coves, bottomlands, and side branches, many wildlife species such as deer, turkey, squirrel, and bear will find excellent food and cover; but these optimum conditions should not be expected for these species everywhere. A pine stand on dry, shale soil may always be better suited for quail and squirrel within the overall framework of the multiple use, sustained yield concept by which National Forests are administered.



Big Game Harvests

County or City	1971-1972			1972-1973			1973-1974		
	Deer	Bear	Turkey	Deer	Bear	Turkey	Deer	Bear	Turkey
Accomack	92			112			162		
Albemarle	531	19	14	682	9	31	816	46	21
Alleghany	922	29	202	739	4	214	895	7	250
Amelia	977		35	1,223		36	1,748		26
Amherst	244	11	16	285	3	17	411	13	34
Appomattox	324		8	412		16	613		12
Augusta	1,270	54	296	1,095	16	311	1,314	13	387
Bath	1,777	15	436	1,686	4	418	1,771	6	471
Bedford	156	11	9	245	8	17	409	7	13
Bland	251	1	32	272		65	292	6	26
Botetourt	1,004	28	228	1,165	11	311	1,170	10	296
Brunswick	341		9	431		22	800		7
Buchanan				0		0			0
Buckingham	1,547		34	1,784		55	2,623	4	29
Campbell	86		6	94		8	160		12
Caroline	1,743		42	1,348		31	1,621		31
Carroll	54			74		0	54		0
Charles City	708			717		0	972		0
Charlotte	110		14	125		11	212		26
Chesapeake-									
Norfolk	222	9		282	2	0	334	6	0
Chesterfield	712		36	1,003		45	1,431		22
Clarke	104	2		87		0	179		37
Craig	786	8	147	932	3	149	1,067	4	166
Culpeper	184		7	236		10	300		7
Cumberland	992		35	1,221		24	1,801		21
Dickenson	10			8		0	13		0
Dinwiddie	932		22	1,151		40	1,486		27
Essex	114		2	139		7	118		4
Fairfax	15			17		1	1		0
Fauquier	450		41	566		56	616	1	49
Floyd	38			60		0	69		0
Fluvanna	1,205		15	1,531		22	2,332		9
Franklin	110		1	152		13	203		4
Frederick	703	1	272	799		145	899		182
Giles	520	6	140	542		223	327	5	271
Gloucester	232		8	315		0	384		12
Goochland	474			572		15	916		22
Grayson	365		33	467		41	549		22
Greene	44	17	2	59	5	3	81	21	4
Greensville	402		5	449		12	480		7
Halifax	153		13	206		25	287		20
Hanover	196			202		0	262		0
Henrico	229			215		0	423		0
Henry	5			7		0	11		0
Highland	852	9	224	908	3	258	1,168	4	282
Isle of Wight	435			569		0	693		0
James City	271			441		0	590		0
King & Queen	291		12	297		23	280		18
King George	237			347		0	384		0
King William	446		11	451		3	489		10
Lancaster	291			282		0	399		0
Lee	46			57		0	60		0
Loudoun	338		20	410		16	466		20
Louisa	591		13	628		26	1,237		26
Lunenburg	166		3	221		5	266		4
Madison	38	24		64	10	2	67	18	2
Mathews	24			35		0	55		0
Mecklenburg	97		0	130		0	181		1
Middlesex	81			78		0	65		0
Montgomery	73		71	78		110	107		108
Nansemond									
(Suffolk)	308	16		416	5	0	458	2	0
Nelson	187	9	15	250	4	26	348	18	20
New Kent	657			797		0	917		0
Newport News-									
Hampton	201			227		0	260		0
Northampton				11		0	12		0
Northumberland	338			384		0	487		0
Nottoway	733		11	781		7	1,129		4
Orange	201		10	262		17	277		16
Page	339	7	25	351	8	27	332	9	40
Patrick	219			252		0	360		0
Pittsylvania	163		11	202		12	305		4
Powhatan	841		20	1,051		20	1,693		21
Prince Edward	194		13	304		21	364		13
Prince George	867		6	1,084		15	1,668		14
Prince William	349		29	388		22	463		11
Pulaski	135		22	154	1	17	194	1	15
Rappahannock	194	6	7	297	1	8	408	14	15
Richmond	240			225		0	330		0
Roanoke	27		32	46		49	71		21
Rockbridge	711	11	224	786	11	363	802	14	425
Rockingham	1,701	34	226	1,902	20	192	2,201	33	215
Russell	27	3	0	22	1	2	28	1	4
Scott	52			57		0	53		0
Shenandoah	1,048	9	261	1,190	4	173	1,247	8	237
Smyth	342	3	27	345	8	29	376	4	21
Southampton	2,063		1	2,783		0	2,900		0
Spotsylvania	472		19	515		14	682		15
Stafford	409		13	502		9	592		8
Surry	714		3	951		0	942		0
Sussex	1,190		15	1,393		0	1,633		0
Tazewell	71	6	9	75		23	91	4	9
Va. Beach	30			40		0	71		0
Warren	409	3	92	456	1	42	516	9	75
Washington	118	1	6	140	2	3	163	2	3
Westmoreland	116			151		0	139		0
Wise	29			90		0	55		0
Wythe	413	9	51	441	1	81	504	5	33
York	600			751		0	608		0

TOTALS 42,369 361 3,663 48,775 145 4,009 60,798 295 4,215

Turkey harvest figures do not include spring kills.



SEASON OUTLOOK

DEER hunters in Virginia should look forward to another plentiful deer harvest. An excellent fawn crop is reported and recent examination of several mature animals showed them to be healthy.

Bear hunters will have slimmer pickings with many Virginia counties closed to bear hunting this year in an effort to preserve breeding stock. In open Shenandoah Valley and northern Virginia counties, an adequate mast crop should contribute to fairly good bear kill. Numerous reports of bear sign along the Blue Ridge north and south of the James River may indicate a better season here than last year.

A good turkey hatch is reported from the mountains and in tidewater areas though a wet August could have wiped out gains. In counties limited to bearded turkeys only, a poor hatch in 1972 and 1973 probably means that legal gobblers will be scarce this fall, but the good 1974 spring hatch should improve next year's bag.

In the south central piedmont, many hickory nuts dropped from trees when they were small and few beeches have mast. From the central mountains south, mast abundance seems to be a little better than last year, but to the north there are areas with no mast, possibly wiped out by a late freeze. In northern mountain counties mast is spotty at best, grapes and berries more plentiful than nuts.

As might be expected, squirrel hunting prospects are no better than the uncertain mast crop. Beech nuts make up the bulk of the mast. In the eastern piedmont, squirrel numbers benefited from fairly good spring litters. In some mountain areas such as in the north-eastern Jefferson National Forest, many squirrels have starved for lack of food during the past two to three years. Except in a number of western counties the season on fox squirrel is closed this year to protect a decreasing population.

Successful quail hatches are reported statewide.

Cottontail populations appear average to good in areas with sufficient food and cover.

Grouse broods are probably up over those of the last three years in the northern mountainous counties west of the Blue Ridge, but there is no evidence of a bumper crop. In southwest Virginia, a good hatch compared to the past several years should mean an improvement. Quite a few grouse have been sighted in western piedmont mountains.

Summer inventories of breeding waterfowl show geese and duck numbers up, so hunters can expect more waterfowl in Virginia.



Edited by MEL WHITE

Flea Collars For Wildlife?

Two workers from the Virginia Polytechnic Institute are working with insecticide-generating collars. They are testing the use of these devices for external parasite control on certain wildlife species. Cottontails and grey squirrels showed no ill effects from the use of the collars. Not only were fleas and other external parasites reduced on animals with collars but also on untreated animals in the same population. In other words when animals congregated together, the insecticide appeared to work for all of them, with or without collars. Hopefully the use of such collars will lead to a better understanding of the role played by external parasites in disease and other factors affecting wildlife populations.



Mr. Edgar R. Lafferty (left) receives award for becoming the 1,000th Tree Farmer in Virginia from Charles Finley (center), Executive Director of Virginia Forests, Inc. The new tree farm is part of Mr. Lafferty's historic Elsing Green Plantation in King William County.

DEVELOPMENT BEGINS AT YORK RIVER STATE PARK

The development of York River State Park will be in several stages spread over a period of years with construction beginning in 1975, announced parks commissioner Ben H. Bolen.

The first stage will consist of a 2.27-mile access road to be built by the Virginia Department of Highways and Transportation from State Route 606 to Taskinas Point in the interior of the park. A completion date in the spring of 1976 is expected, said Bolen.

The roadway, which will have a 20-foot wide pavement and 8-foot shoulders, will provide visitors with an attractive, low-speed artery into the park without causing congestion at the present local service roads. A portion of the access road near State Route 606 will be divided to accommodate fu-

ture park administration and entrance buildings.

Park officials also indicated a second construction stage will be planned in 1975 for day-use facilities. A visitor center and picnic area will be built overlooking the York River, while bicycle and hiking trails are scheduled for access into the park's natural area.

In addition, access to the York River will be accommodated by improving the boating facilities at Croaker Landing. Other proposed facilities include parking, boat launching and a boat dock.

Currently in an undeveloped state, portions of York River State Park are used by deer and squirrel hunters in season. The planned improvements should make this sport more available to area hunters.



Now that's a Turkey! Mr. L. T. Bane took this 22½ pound bird on Wabash Mountain in Giles County November 30, 1973. The wingspread of the bird was 63".

Know Your WARDENS

Text and Photos

By F. N. SATTERLEE
Information Officer

FRANCIS C. BOGGS

Area Leader Warden



Heavily fished 13,000 acre Lake Anna, Virginia's newest fishing hot spot, is where a large part of Boggs' boat patrol work is performed.

SPOTSYLVANIA County was where Francis was born and where he was raised and did his growing up on the 365-acre farm which his father owned and operated. In addition to farming, his father was one of the officers in the county government and was district manager for the Farm Bureau Insurance Company. Consequently, Francis was exposed to many aspects of the outdoors and wildlife from early childhood. His father was very insistent that safety and good sportsmanship be the basic guideline in every aspect of hunting and fishing. He remembers that during his boyhood, times were hard. When he went hunting, he was allowed to take only the amount of ammunition that corresponded to the legal limit of the game that he sought. These limitations took into consideration not only the cost of the cartridges but were also part of the invaluable training that Francis received from his father concerning life in general and the appreciation of things wild.

After graduating from Spotsylvania High School, Francis enlisted in the then Army Air Corps where he served three years in the Strategic Air Command. One year of that time was spent in a hospital recovering from the injuries he received in an aircraft crash. After the military, he spent two years at Morgantown University in West Virginia studying forest management. Returning to Virginia he accepted a job with the Fredericksburg Police Department and subsequently was employed by the State Forestry Department in the Fire Control Division.

Early in 1957, Francis learned of an opening with the Game Commission and was appointed as a warden during February of that year with an assignment to the city of Fredericksburg, replacing P. Blake Lewis, who retired. He was promoted to area leader warden in 1966 and is currently responsible for the warden activities in the area around Quantico, Spotsylvania, Stafford, Louisa and in Fredericksburg.

Since the construction of Lake Anna was completed and the waters were opened to fishing and recreation in 1972, his summers have become increasingly busy in that regard. As he patrols the lake, which has become one of the most popular in the state, he recalls that his father predicted more than 30 years earlier that such a lake would be built. He reflects also on the fact that one of his greatest rewards is being able to prevent water-related accidents through education. Another and more poignant aspect of this facet of his work is the actual life-saving rescue operations in which he and his fellow wardens have been involved. Francis is also grateful for his continuing opportunity to work with young people in teaching them the abundant values of wildlife, the outdoors and good sportsmanship.

The former Shirley Price of Norfolk, Virginia, is Mrs. Boggs. She and Francis and their son, Douglas, make their home in Spotsylvania County.



Edited by ANN PILCHER

Would you volunteer to study ichthyology? Last spring one hundred seventh grade life science students at Salem Church Junior High School, Richmond, elected to study this topic for one week.

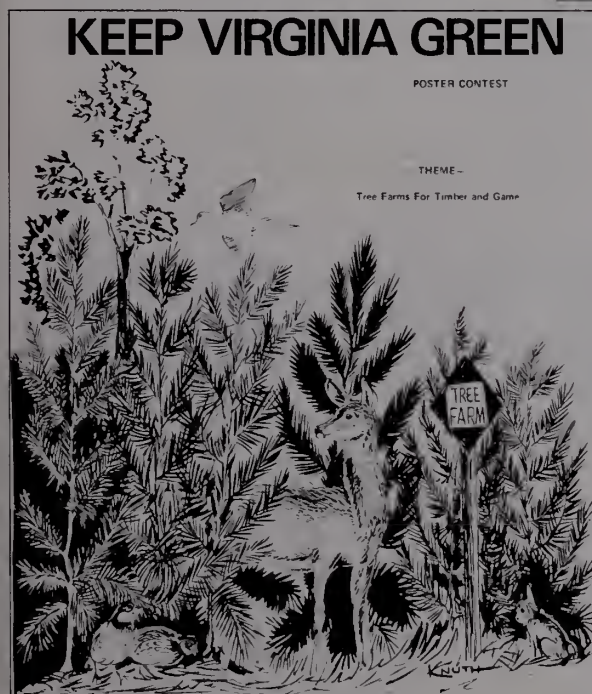
Richard Rowland designed the classroom self-paced program with the assistance of Dr. James Reed of Virginia Commonwealth University and with materials from the Virginia Commission of Game and Inland Fisheries.

In class, students studied fish, their habits and habitats. In lab, they used preserved specimens, learning to distinguish the various species.

Students who successfully completed the unit and quiz were eligible for the Chesterfield County field trip. Thirty students whose names were drawn gathered up seines, old tennis shoes, a collecting permit, and headed out to catch fish.

At the creeks visited, teachers and students managed to get soaked by the end of the day. They caught a few fish, and surely they had fun.

From Classroom to Creek



Natural Science for Youth Foundation Meets

Tree Farms—For Timber and Game, theme of this year's Keep Virginia Green poster contest, which runs from October 1-November 30. Entries should be sent to Virginia Forests, Inc., One N. 5th St., Richmond, Va. 23219, who, upon request, will furnish complete set of rules and list of prizes. This year's contest is sponsored by Virginia Forests in cooperation with the Va. Div. of Forestry and the Va. Game Commission.

November 12-15 the Natural Science for Youth Foundation is holding its annual Conference-workshop in Nashville, Tennessee. This is a Conference planned for professional people working in nature centers or junior science museums, but the program offers useful information and discussions for anyone interested in environmental education. Registration is free, but open only to members of the Foundation.

The Conference will provide a splendid opportunity for educators and naturalists to learn about some of the best programs in the South today. Further information may be obtained from Natural Science for Youth Foundation, 763 Silvermine Road, New Canaan, Connecticut 06840.



Edited by JIM KERRICK

HOW TO BUY A USED BOAT

Many people become boaters by first buying a used boat, be it from a friend who's graduated to a larger boat, or local marine dealer. But you must be careful or you may be stuck with something you don't want at an expense you can't afford.

Here are a few tips on buying a used boat.

Timing: When's the best time for boat buying? Off season. In the northern states the lowest prices are at the end of the boating season—September, October and November. Many people sell their boats so they won't be faced with storing them for the winter. Also, selling the boat in the off season saves time, energy and money in preparing the boat for the next season. Dealers also sell boats cheaper at that time of year so they can make room for newer models.

Place: Where to buy is not too hard. Your neighbor may have a boat he wants to get rid of; you can read the classified section of the local newspapers; and you can go to a marine dealer.

Type: Before buying *any* boat, be it new or used, you must decide what you're going to use the boat for. Decide in advance whether you want a trailerable runabout, a cartopper or an offshore hull. You'll save yourself time by not looking at boats you aren't really interested in.

Will you be using the boat strictly for fishing, water-skiing or for the whole family to cruise with?

Boat Dependability: You really can't tell how a boat runs until you get it in the water, but that's not always possible. However, you can certainly judge the exterior appearance of the boat to see if it has been taken care of. The outboard motor can be checked while the boat is still in storage by placing the motor in a bucket of water kept

full with a garden hose while running the motor.

Ask how fast a powerboat travels at various RPMs. Ask what the fuel consumption is. Check for bent propellers. Look at the exterior of the boat for nicks, scratches and scrapes (did the owner use boat bumpers?). A damaged hull means a lack of care and maintenance. Unless the boat is a terrific buy or you like fixing things, don't buy a boat in poor condition.

Check the head in a cruiser, especially if it's equipped with a holding tank. If you smell oil or gas, the owner didn't take care of the engine properly. Check the galley and all fuel lines. Turn on all electronic equipment to make sure they work. Make sure you have proper ventilation. Check for water damage, wood rot, corrosion, especially in the bilge.

In a sailboat, check the keel and all the sails.

And if you're not completely sure you have a good buy, contact a marine surveyor for a thorough check-up. It'll cost you, but it'll be worth it in the long run for your own peace of mind.

PROTECT YOUR MOTOR FROM WATER DAMAGE!

Whether your boat was capsized during a storm or just drenched in heavy seas, your outboard motor needs special care to prevent serious damage. Haste is crucial to saving the motor from damage after it has gotten wet.

Salt water does far more damage to the mechanisms of an outboard than fresh water; but in either case, you must act fast.

If your motor has fallen into fresh water (or if it has gotten wet in a basement flood), little damage will occur if recovery from the water is within three hours. Following are a few steps to take for a fresh water dunking:

—Pour fresh water over the motor. Remove the spark plugs and the carburetor orifice screws; drain all fuel lines, including the gas tank. Pull the starter cord or key switch until all internal water has been removed. Spray a motor lubricant inside the spark plug holds.

—Re-assemble the motor and start the engine. If it starts, keep it running for at least a half hour, usually longer.

—If the engine doesn't start, remove the spark plugs again and inspect the electrodes for water fouling. Air dry the plugs or replace them with new ones. Start the engine once again.

—If it still doesn't start, take it in for servicing.

Salt water dunking creates more problems. And if the motor was running at the time, chances are the engine was damaged by the salt. To correct the situation:

—Recover the motor and bring it to the nearest servicing station or dealership for flushing and complete disassembly. Saltwater corrosion can rapidly take its toll, so act fast.

—If, for some reason, you can't take it in for immediate servicing, dunk the engine into fresh water and leave it there until you can get to a station. Fresh water will inhibit salt corrosion.

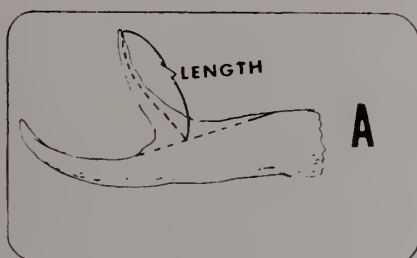
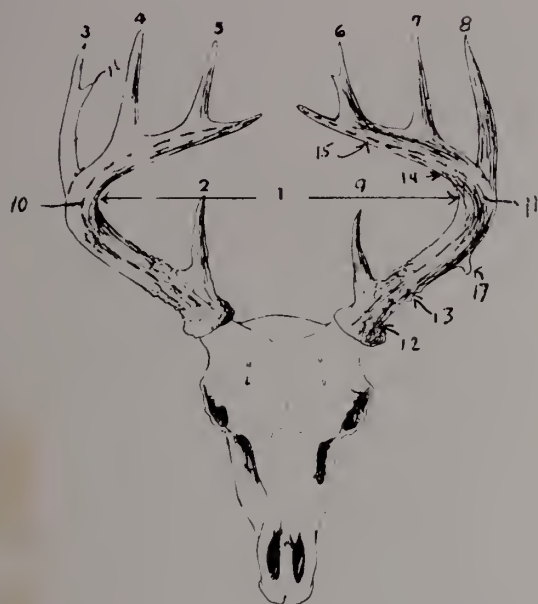
If your engine was not running, take it out of the salt water and remove the spark plugs, fuel lines and drain the carburetor. Inspect the engine and repair any broken parts or cracked wires. Drain the gas tank and put in new fuel.

Try to start the engine and keep it running for at least a half hour.

If you've used a high grade of oil, this will check the corrosion process. If the engine doesn't start, dunk it into fresh water and leave it there until you get it to a servicing facility.

When a motor is waterlogged, haste is crucial, or you'll have to scrap it.

How Does That Trophy Rate?



EACH year there are a number of impressive deer heads that are not entered in the State Trophy Contest because the persons who killed them feel they will surely be nosed out by a larger specimen. Consequently, one or more divisions are won by mediocre heads when larger racks are known to have been killed. In a true contest it is impossible to set up minimums for entry because average quality and number of entries varies markedly from year to year. The following procedure is recommended as a rough test for a prospective entry but is by no means intended to discourage entry of heads which do not measure up to these standards. All heads must be measured by an official measurer at the contest for final score.

To estimate the score of your head, add together (all measurements to nearest $\frac{1}{8}$ inch) the spread of the main beams (1) plus the number of points plus the length of all points and random prongs (2-9, 16 and 17—See insert A) plus the length of both main beams (10 & 11) and the circumference of both antlers at the burr and between all points (12-15). After totaling all these measurements and counts, subtract half the length of all abnormal points (such as 16 & 17) and one-half the difference between corresponding length and circumference measurements on one antler and those on the other.

If the rack scores 225 or better, have it officially measured for Boone and Crockett competition. (Max M. Carpenter, Route 1, Dayton, Virginia, is official measurer.) If it has 9 or more points and scores 150 or over, or if it has 7-8 points and scores 100 or over, or if it has 6 or less points and scores 50 or over, it has a good chance of placing in the Game Commission's Big Game Trophy Contest.

The contest was started in 1941 and has been held annually since. Heads are first judged in regional competition at Harrisonburg or Newport News. The state contest is held in conjunction with one of the regional events alternating between eastern and western sites. Heads must be killed during the previous season to be eligible and the entrant must furnish the Big Game tag or an affidavit from the game warden certifying the entry as a legal kill.

1974

State Big Game Trophy

- There are no advance entry forms. Heads or antlers must be carried or shipped to the proper regional contest where they will be officially measured and entered. Bear skulls only need to be entered in state contest. Turkeys are scored by length of wing, tail, and beard.
- Prizes for regional winners
- Trophies for first place State winners in each Division
- plus *Honorable Mention Certificates*

DEER
BEAR
TURKEY



Contest

The east-west regional dividing line will follow the east-west deer season line in effect the year the entry was killed.

WESTERN REGIONAL CONTEST

October 24, 25, 26
Fair Grounds, Rt. 753
Harrisonburg, Virginia

For entry details contact

Roy W. Heishman
Harrisonburg, Virginia
Phone: 703/434-9957 (B);
703/434-2496 (R)

Sponsored by the
Harrisonburg-Rockingham
County Izaak Walton League

STATE CONTEST

October 26
Fairgrounds, Rt. 753
Harrisonburg, Virginia

Virginia

Commission of Game and
Inland Fisheries

(Heads must be physically present to win.)

Only animals first entered
in regional competition are
eligible

EASTERN REGIONAL CONTEST

October 19
Hotel Chamberlain
Fort Monroe
Hampton, Virginia

For entry details contact

Robert L. McDaniel
39 Glendale Road
Newport News, Virginia 23606
Phone 804/878-3692 (B);
804/596-6785 (R)

Sponsored by the
Virginia Peninsula Sportsmen's Assn.

Enter The Marlin Essay Contest

**“What can the hunter, as an individual,
do to help preserve the sport of hunting?”**

September 28 through November 30, 1974.

Prizes

Marlin Single Shot .22 Rifles

\$1,000 savings bonds

Trips to San Diego.

See your Hunter Safety Instructor for details.



Entry Blanks

available from

All State Game Wardens

or from the

Virginia Game Commission Office

4010 W. Broad Street

Richmond, Virginia 23230